

CLAIMS

1 1. A double-stranded conducting polymer, said polymer selected from the group
2 consisting of Polyaniline:Poly(vinylphosphate) double-stranded complex,
3 Polyaniline:Poly(acrylic acid-co-vinylphosphate) complex, Polyaniline:Poly(mathacrylic acid-
4 co-vinylphosphate) complex, Polypyrrole:Poly(vinylphosphate) double-stranded complex,
5 Polypyrrole:Poly(acrylic acid-co-vinylphosphate) complex, Polypyrrole:Poly(vinylmathacrylic
6 acid-co-vinylphosphate complex, Polyaniline:Poly(methylacrylate-co-vinylphosphate) complex,
7 Polypyrrole:Poly(methylacrylate-co-vinylphosphate) complex, Polyaniline:Poly(butylacrylate-
8 co-vinylphosphate) complex, and Polypyrrole:Poly(butylacrylate-co-vinylphosphate) complex.

1 2. The double-stranded conducting polymer of claim 1, wherein a first strand is a
2 reversible electron donor or acceptor.

1 3. The double-stranded conducting polymer of claim 1, wherein a second strand
2 includes the integration of appropriate ligands.

1 4. The double-stranded conducting polymer of claim 2, wherein the ligand is a
2 carboxylic or phosphate functional group.

1 5. A composition including a conducting polymer, said composition comprising:
2 polyaniline or polypyrrole, Poly(vinyl butyral), molybdenum oxide or cerium oxide magnesium
3 silicate, carbon black or lamp black, n-butyl alcohol, isopropyl alcohol, and water.

1 6. The composition of claim 5, further comprising phosphoric acid, water, and
2 isopropyl alcohol.

1 7. A composition including a conducting polymer to treat metal surfaces to provide
2 a stable interface for adhesive binding or coating. ✓

1 8. A formulation for surface treatment reagents which includes a double-stranded
2 conductive polymer.

1 9. The use of water-borne double-stranded conducting polymers for as a surface
2 conversion or surface treatment agent for metal surfaces, as a early-warning indicator for metal
3 corrosion, as a component for a wash primer for aluminum alloys, magnesium alloys, steel and
4 other non-noble metals, as a surface modification coating on non-metallic surfaces to catalyze
5 deposition of decorative and functional top coatings, as an additive to improve the performance
6 of adhesive bonding of metals, or for others that are logical extensions of the above application.